

Hanford Site Bald Eagle Monitoring Report for Fiscal Year 2016



Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-09RL14728



P.O. Box 650
Richland, Washington 99352

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Date Published
April 2017

Prepared by
K. J. Cranna

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management



P.O. Box 650
Richland, Washington 99352

APPROVED
By Lana Perry at 12:45 pm, Mar 30, 2017

Release Approval

Date

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Acronyms and Abbreviations

| | |
|-------|--|
| DOE | U. S. Department of Energy |
| ESA | Endangered Species Act |
| FY | Fiscal Year |
| GIS | Geographic Information System |
| WDFW | Washington State department of Fish and Wildlife |
| USFWS | U. S. Fish and Wildlife Service |

1.0 Introduction

A national symbol of the United States, the Bald Eagle (*Haliaeetus leucocephalus*) plays an important predatory role in the riverine ecosystem at U. S. Department of Energy (DOE) Hanford Site. Bald eagles occupy the site annually during winter and early spring. Monitoring eagles during this period is essential to maintain current biological information about Bald Eagle abundance and distribution on the Hanford Site, to ensure compliance with protection regulations, and to inform future protection and management efforts. This monitoring report provides an overview of Bald Eagle activity on the Hanford Site between November 2015 and July of 2016.

1.1 Bald Eagles on the Hanford Site

Bald Eagles primarily use the Hanford Reach of the Columbia River as a wintering area and are attracted to the abundant fish and waterfowl found along the river. Bald Eagles arrive on the Hanford site in mid-November to forage and are usually present until mid-March. Wintering eagles use different habitats for various activities such as perching, foraging, and roosting. Although Bald Eagles may be observed far from water, they typically occupy habitats within 0.25 miles (400 meters) of the Columbia River and use trees growing along the shoreline for perching and roosting.

Nest building has occurred most years, but most nests on the Hanford Site are usually abandoned by mid-March, as the eagles begin to migrate toward summer feeding areas or nesting territories. Beginning in 2013, Bald Eagles have occupied and successfully produced fledged young from a nest located upstream of Wooded Island for three consecutive years. In other portions of Washington State, nesting may begin as early as December and young may fledge as late as August ([DOE 2013](#)).

1.2 Bald Eagle Protection and Management at Hanford

Bald eagles are a success story for species protection under the *Endangered Species Act of 1975 (ESA)*. In 2007, forty years after the Bald Eagle was listed as endangered and given protection under the ESA, the U.S. Fish and Wildlife Service (USFWS) determined that the population of bald eagles in the lower 48 States had recovered sufficiently to be removed from the ESA endangered and threatened species list. The State of Washington also down-listed Bald Eagles from threatened to sensitive. Despite the significant recovery of bald eagle populations, federal laws including the *Bald and Golden Eagle Protection Act of 1940* and the [Migratory Bird Treaty Act of 1918](#) still provide protection for eagles, their nest trees, and communal night roosts. In addition, following delisting, the USFWS developed the [National Bald Eagle Management Guidelines](#), which provides monitoring and management guidance for Bald Eagles ([USFWS 2007](#)).

At Hanford, DOE has developed the *Bald Eagle Management Plan for the Hanford Site, South-Central Washington* ([DOE 2013](#)). This document provides an overview of Bald Eagle distribution, behavior, and ecology important to understanding the issues related to management and protection of this species on the Hanford Site, and uses this information to define the actions that constitute the DOE policy regarding

Bald Eagle protection and management on the Hanford Site. Key among these actions are protective measures for roost sites and nests, which are based on federal and state guidelines.

Roosting locations provide shelter from winter weather and serve a social function. The *Bald Eagle Management Plan for the Hanford Site, South-Central Washington* ([DOE 2013](#)) relies on a roost-site definition developed by the Washington Department of Fish and Wildlife (WDFW) under its former management policies; a roost site is defined as a tree or a group of trees in which at least three eagles roost for at least two nights during more than one year. Administrative protection is initiated at a new roost site if monitoring determines the presence of three or more eagles on at least two nights during a year, or if continued monitoring over two or more years determines that the site is occupied at night by one or more eagles at least 30 percent of the time ([DOE 2013](#)). Administrative protections and access restrictions are discontinued at sites where monitoring over two or more years indicates night roost occupancy by one or more eagles is less than 30 percent of the time and there is little or no indication of use by more than two eagles ([DOE 2013](#)). Bald eagle night roost locations on the Hanford Site are protected from disturbance from November 15 through March 15 with 400-meter buffers (Figure 1).

Eagle nesting activity is documented and potential nest sites are monitored to determine if new nest protection areas are necessary. A nest is considered occupied if a pair of eagles continues to use the nest after May 10, which is the latest first-egg date recorded for Bald Eagles in Washington State (Burke Museum 2013). When a new nest is identified, nesting exclusion buffers of 400-meters are enforced until the nest is abandoned or the young eagles have fledged. The USFWS generally recognizes that a Bald Eagle nest is considered active for five years following occupation by a pair of eagles during the breeding season. Therefore, nest-site buffers are maintained (throughout the roosting and nesting seasons) for five years following occupation.

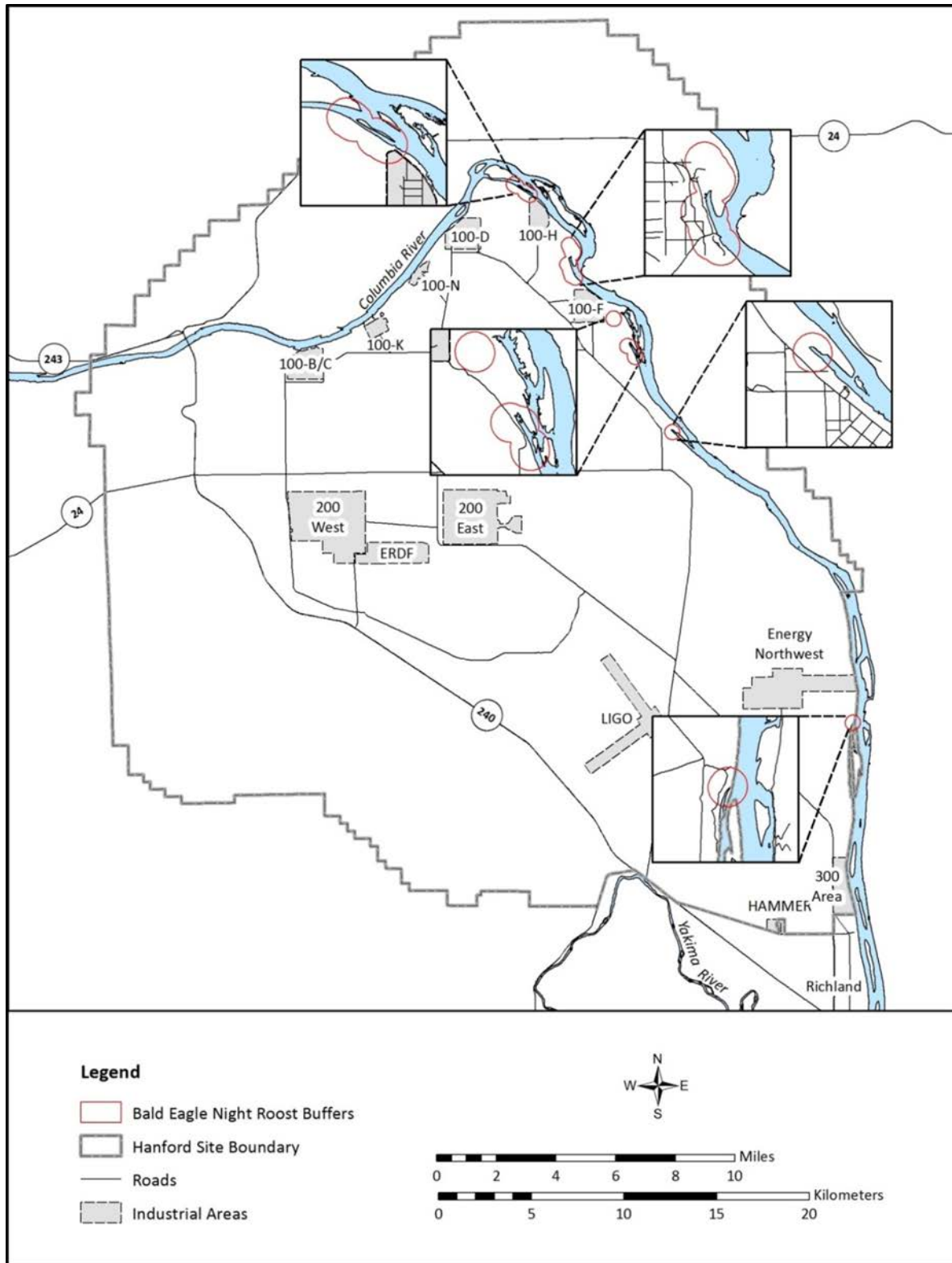


Figure 1. Protected Bald Eagle Night Roosts for FY2016

1.3 Hanford Site Bald Eagle Monitoring

Beginning in 2013, two levels of effort were established for annual Hanford Bald Eagle monitoring: comprehensive and limited. Comprehensive monitoring is performed triennially and limited monitoring occurs all other years. Boat surveys are performed monthly (December to February) to document the abundance, age class, distribution, and activities of Bald Eagles using the Hanford Reach during both types of monitoring. During limited monitoring, night roost surveys are performed monthly (December to February) to document the continued usage of the currently protected communal night roosts. During comprehensive monitoring, the night roost monitoring frequency is increased to weekly or bi-weekly throughout the season to determine if administrative protections are justified at existing locations or if they need to be established at new roost sites. A night roost survey is performed on the same date as each boat survey in order to compare diurnal and nocturnal abundance and distribution. This information is used during comprehensive monitoring to help determine whether or not there is a justification to search for new roost sites. Fiscal Year (FY) 2015 monitoring results suggested that Bald Eagles were potentially roosting in unprotected locations on the Hanford Reach ([HNF-59488](#)). Analysis of these results provided five potential night roost locations that were monitored during FY 2016 in addition to the eight currently protected night roosts. Nest surveys are performed in the same manner during all years. The level of effort for any given year may be modified based on budget constraints, federal or state agency information requests, and/or if Hanford Site remediation projects occur near or within Bald Eagle nest or night roost protection buffers.

Hanford Site Bald Eagle monitoring for FY 2016 followed the comprehensive approach and included monthly boat surveys and weekly night roost surveys throughout the Bald Eagle wintering season, as well as nest monitoring that continued into the spring (Table 1).

Table 1. Hanford Site Bald Eagle Monitoring Schedule Summary

| Annual Bald Eagle Monitoring Event Type | Schedule (From 2013 to 2019) | Surveys Performed | Survey Frequency during Season (Dec. through Feb.) | Survey Purpose |
|---|--|-------------------|---|--|
| Comprehensive | Triennial: FY 2013 FY 2016 FY 2019 | Boat | Once per month | Document age class, distribution, and abundance |
| | | Night Roost | Weekly or bi-weekly (depending on budget allocation) | Determine if administrative protections are justified at existing locations or need to be established at new roost sites |
| | | Nest | Once per month (continues into spring/summer as needed) | Establish nest protection areas and monitor for nest success or abandonment |
| Limited | All other years: FY 2014 FY 2015 FY 2017 FY 2018 | Boat | Once per month | Document age class, distribution, and abundance to determine if new roosts should be monitored during future comprehensive events. |
| | | Night Roost | Once per month | Document continued usage of currently protected night roosts |
| | | Nest | Once per month (continues into spring/summer as needed) | Establish nest protection areas and monitor for nest success or abandonment |

1.4 Objectives

The primary objective of this monitoring effort was to document Bald Eagle use areas on the Hanford Site in accordance with the *Bald Eagle Management Plan for the Hanford Site, South Central Washington* ([DOE 2013](#)). Annual surveys of Bald Eagle night roosts and nest sites provide the information required to maintain and/or update administrative buffers to minimize disturbances to eagles and their habitats. Long-term trends of Bald Eagle distribution and abundance allow for the assessment of potential impacts from Hanford Site operations and the effectiveness of Bald Eagle management on the Hanford Site.

2.0 Methods

FY 2016 Bald Eagle monitoring followed the comprehensive level of effort as described in Section 1.3 and consisted of night roost surveys, boat surveys, and nest surveys. Each of these survey methods is described in the sections below.

2.1 Night Roost Surveys

The currently protected ($n = 8$) and potential ($n = 5$) night roosts were divided into thirteen monitoring areas. Each area was designated a specific monitoring location (Figure 2). These areas were monitored by three teams in order to perform coinciding surveys on all thirteen night roost areas in a single evening. Surveys were conducted at dusk, from 30 minutes prior to sunset until there was insufficient light to see individual birds. Surveyors approached each location in a vehicle, staying outside of the designated 400-meter buffer zones. Spotting scopes and binoculars were used to determine the number of eagles present, age class (adult vs. juvenile), and activity occurring at the roost. Surveyors then marked the specific location where the eagles were roosting on an aerial photo of the roost location. After recording the data from a roost location, surveyors quickly proceeded to the next location in order to maximize the number of surveys per night.

Analysis of trail camera surveys performed at two night roosts for 27 nights during FY 2014 monitoring revealed that eagle activity typically increased as it became darker, suggesting that monitoring should occur as close to twilight as possible ([HNF-59488](#)). During FY 2014 and FY 2015, night roost monitoring began ten minutes prior to sunset. The addition of the five potential night roosts in FY 2016 made it logistically unmanageable to survey all thirteen of the roosts when beginning ten minutes prior to sunset. To mitigate this, teams began at 30 minutes prior to sunset and alternated their direction of travel on a weekly basis. Therefore, the first roost site visited during any given week by a team was the last site visited during the following week by the same team.

At the conclusion of night roost monitoring for the season, all observations were digitized using geographic information system (GIS) software. The digitized points were then combined with all previously collected MSA PSRP night roost observation points. The resulting data set represents all night roost observations from FY 2012 to present and provides the observed spatial extents of each night roost location. The cumulative observation points for each protected night roost were then buffered by 400 m to create protection zones that are enforced during the night roost season. The resulting boundaries will be added to the PSRP Natural Resource Protective Buffer Zones map prior to the onset of the FY2017 Bald Eagle wintering season. The map can be accessed at:

http://www.hanford.gov/files.cfm/NaturalResource_Buffers_WebMap.pdf.

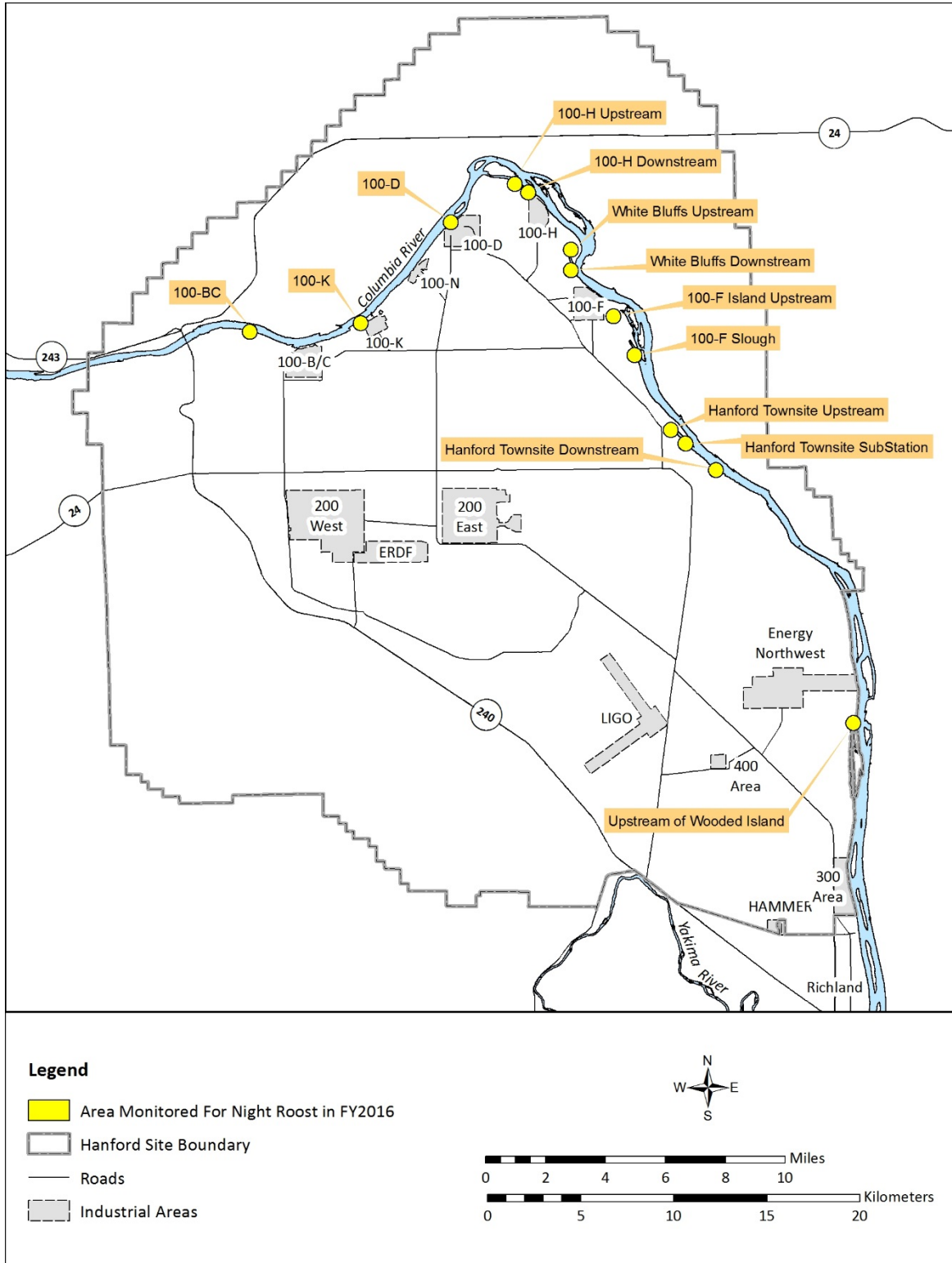


Figure 2. Locations Monitored for Bald Eagle Night Roosting during FY2016

2.2 Boat Surveys

Boat surveys were performed to determine the age class, distribution, and number of eagles on the Hanford Reach. Both shorelines of the Columbia River along the Hanford Site were surveyed, beginning immediately upstream of Vernita Bridge and ending at the 300 Area (Figure 3). All boat surveys were performed on dates corresponding with night roost surveys. The performance of boat and night roost surveys on the same day allows project staff to correlate day and night counts and distributions to identify potential night roost areas, nest sites, and important daytime perching areas. All spatial data collected during the surveys were transferred from hard copy maps into a GIS for analysis.

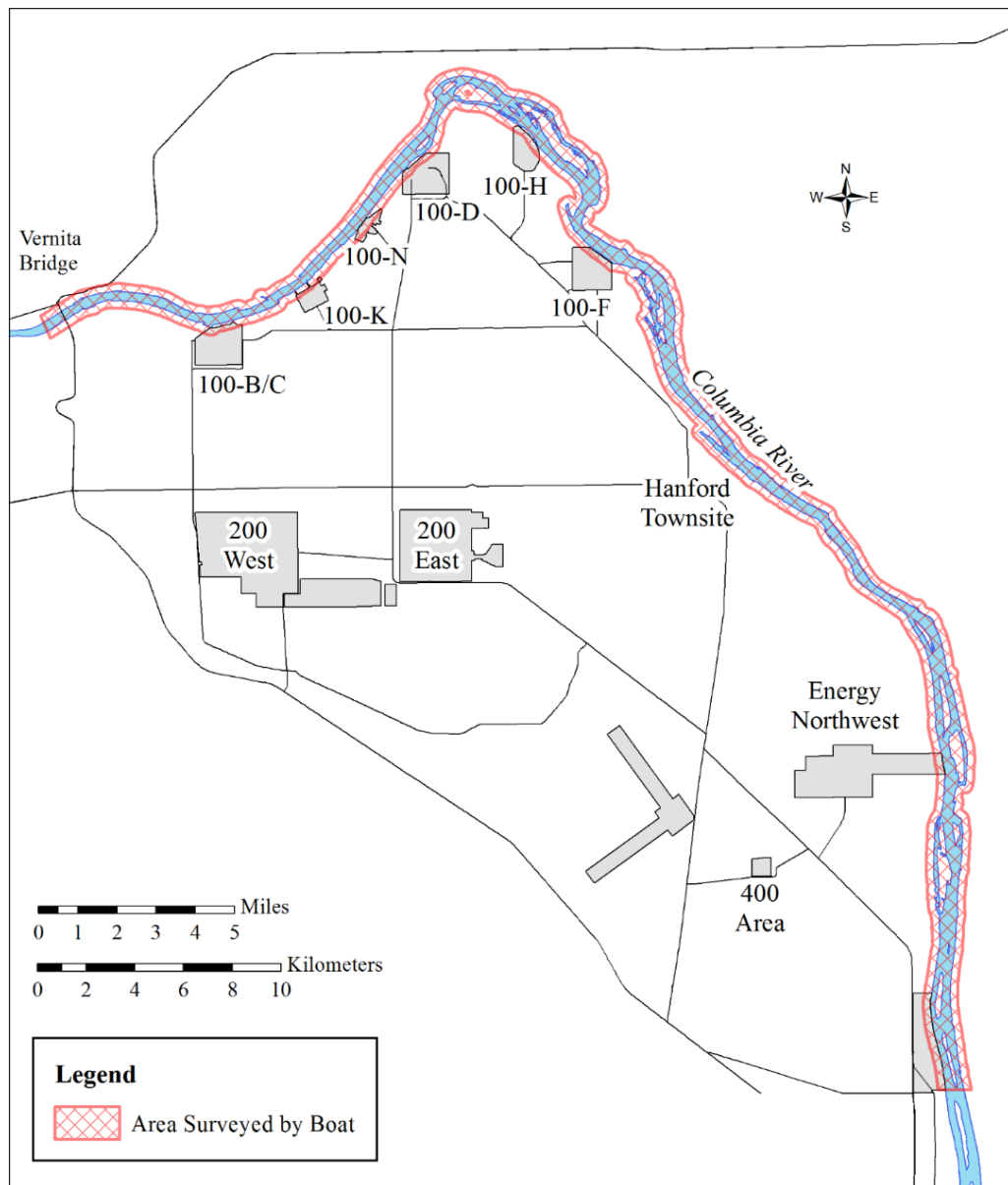


Figure 3. Area Surveyed by Boat

2.3 Nest Surveys

Nest surveys were performed at two potential nest locations: White Bluffs peninsula and Benton substation (Figure 4). Nesting behaviors were documented at both sites during night roost monitoring (November through February). The lack of foliage on trees during this time period allows surveyors to identify potential nest sites before they are obscured by leaves in late spring. Nest surveys typically consisted of 1-hour observations in the area of interest, documenting any signs of nesting activity (e.g., territory defense, nest tending, pair bonding behaviors, etc.). On March 16, 2016, nest surveys were performed at both potential nest locations during a test of Energy Northwest's emergency management sirens located along the river corridor to document any potential effects on the nesting eagles.

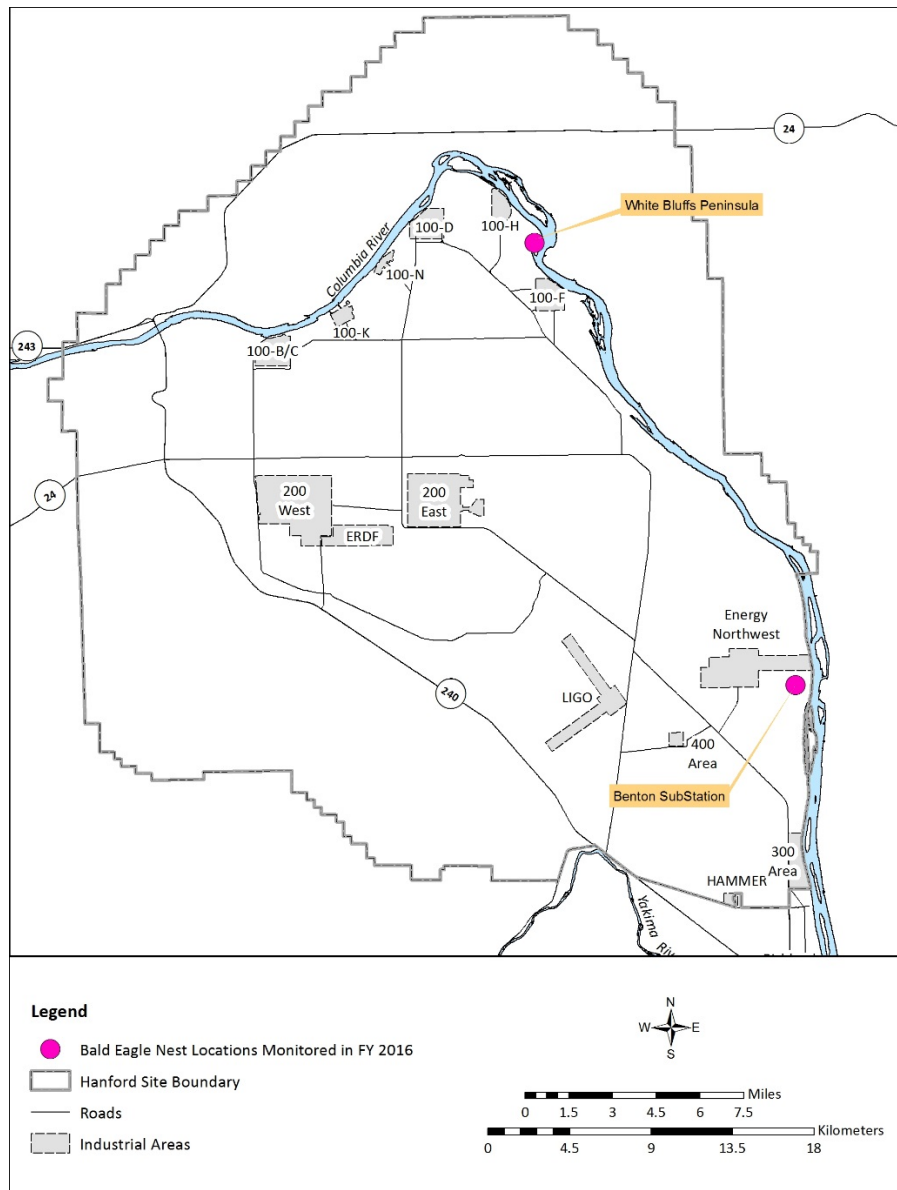


Figure 4. Bald Eagle Nest Locations Monitored in FY 2016

3.0 Results and Discussion

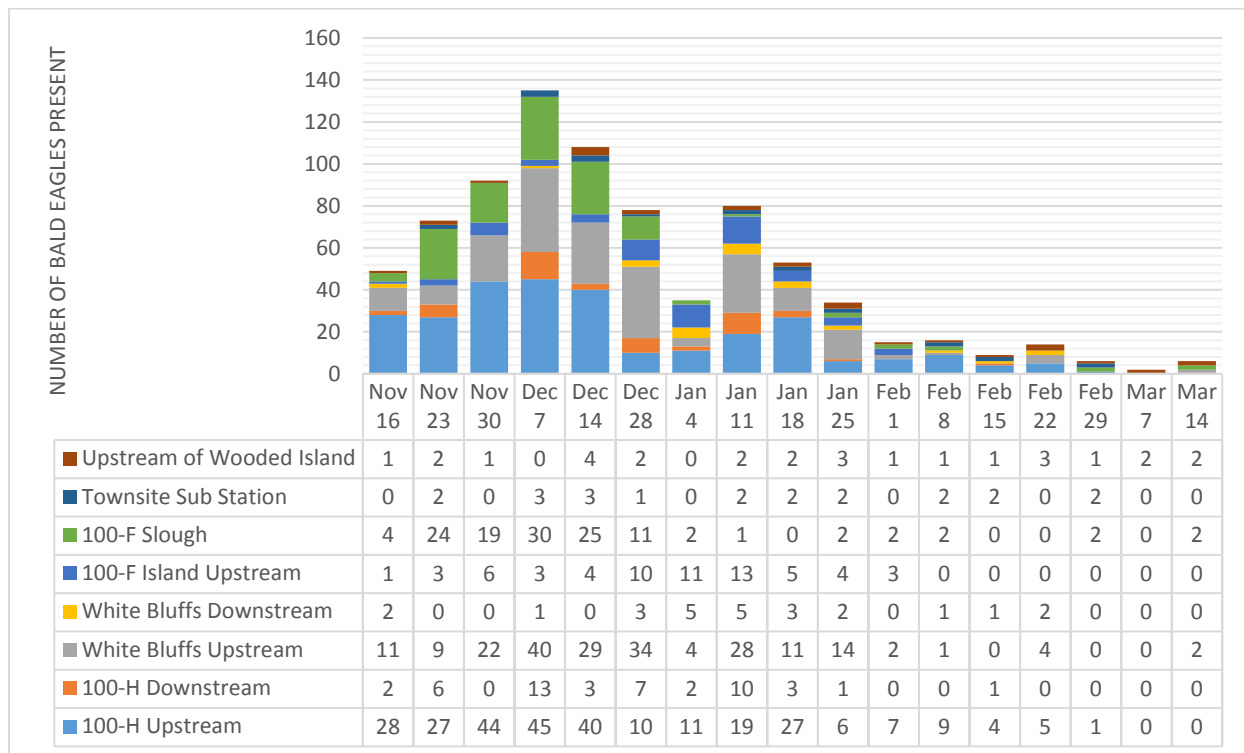
3.1 Night Roost Surveys

Night roost surveys were performed weekly at all night roost locations throughout the FY 2016 season with the exception of the week of December 21 when staff resources were insufficient for a full survey. The first night roost survey was conducted on November 16 and the final survey was completed on March 14. The majority of eagles present during the early season were juveniles, who grouped in large numbers in areas where spawned out fall Chinook salmon carcasses are known to accumulate. As the season progressed, the number of juveniles on the Hanford Reach decreased rapidly while the number of adults declined at a slower rate. This was likely due to juvenile eagles taking advantage of the fall Chinook salmon (*Oncorhynchus tshawytscha*) food resource then leaving after the carcasses were no longer available, while adult eagles continued to use the Hanford Reach, likely feeding on waterfowl and carrion.

3.1.1 Currently Protected Night Roosts

Based on the results of the FY 2016 night roost surveys all eight of the currently protected night roosts qualified for continued protection under the communal night roost definition stated in Section 1.2. Results for the currently protected roosts are summarized in Table 2 and summaries of observations are described in the following paragraphs.

Table 2. Survey Results for the Currently Protected Night Roosts during FY 2016



100-H Upstream

The 100-H Upstream night roost was the most heavily used roost on the Hanford Site. During the FY 2016 season, a total of 283 eagle observations were documented. Three or more eagles were observed during 14 of the 17 surveys. A survey of the 100-H Upstream night roost on December 7 resulted in the maximum count of 45 eagles at a single roost site for FY 2016.

White Bluffs Upstream

White Bluffs Upstream was the second most utilized roost with a total of 211 eagle observations. Eleven of the 17 surveys documented three or more eagles. A maximum count of 40 eagles was documented during the December 7 survey. Use of this roost dropped drastically during the beginning of February, possibly due to the pair of eagles attempting to nest at the roost site and defending the area.

100-F Slough

The 100-F Slough roost was heavily utilized during the first third of the season but usage dropped off to two or less Bald Eagles for the remainder of the weekly surveys. The 100-F Slough roost had a total of 126 observations and 6 surveys documenting three or more eagles. A pair of adult Bald Eagles were present at the roost for the majority of the surveys performed during last two-thirds of the season, however, no nesting activities were observed.

100-F Island Upstream

100-F Island Upstream was moderately used for the first two-thirds of the season with a total of 63 observations with 10 surveys documenting three or more eagles. The max count at this roost site was 13 eagles which were observed during the January 11 survey. No eagles were observed at the site after February 1.

100-H Downstream

100-H Downstream was used sporadically throughout the first half of the season. Surveyors noted that eagles appeared to move back and forth from this site to the 100-H Upstream roost site as twilight approached. In recent years this roost has been used very little, which was most likely due to heavy remediation activity at the 100-H reactor site. With these activities slowing down, eagles may begin to use this site with more regularity in the future. A total of 48 eagles were observed at this roost with a maximum count of 13 on December 7. Six of the 17 surveys documented more than three eagles at the roost.

Upstream of Wooded Island

Although this area is primarily a nest site with a pair of adult eagles documented during most surveys, an occasional juvenile eagle or two were observed at the roost which qualified this site for continued

protection as a communal night roost. A total of 28 observations were documented during the FY 2016 season. Five of the 28 observations were juvenile eagles.

White Bluffs Downstream

White Bluffs Downstream was utilized primarily during the mid-season with low numbers of eagles. A total of 25 eagle observations were documented at this roost. Four of the 17 surveys performed at this site documented three or more eagles.

Hanford Townsite Substation

This roost site was previously considered part of the Hanford Townsite Upstream roost although it was outside of the current buffer. After analyzing the roost surveys performed in recent years (2014-2015), project staff determined that there are two separate sets of roost trees in this area that cannot easily be surveyed from one location. The majority of qualified eagle observations from those previous years occurred in this location. Therefore, this location was considered a currently protected roost and the Hanford Townsite Upstream roost was considered a potential roost during this monitoring event. This roost site was used consistently throughout the season, primarily by a pair of adult eagles. During two of the surveys 3 eagles were documented, thus continuing its status as a qualified communal night roost. A total of 21 observations were documented at this site during FY 2016 monitoring. Although there were consistent observations of a pair of eagles at this roost site, no evidence of a nesting attempt was documented in this location.

3.1.2 Potential Night Roosts

GIS analysis of boat and night roost surveys performed during FY 2015 revealed five potential night roost locations that were monitored during FY 2016 ([HNF-59488](#)). Based solely on direct observations none of the potential night roosts qualified under the definition of a communal night roost. A summary of the survey results and observations at each location are described in the following paragraphs.

100-BC

In recent years boat survey results revealed a consistent use of this section of the Hanford Reach during the daytime. With no currently protected roosts in this area, the data suggested that it was likely that eagles using this area for foraging could be roosting in the vicinity. However, no eagles were observed at this site during the FY 2016 season night roost surveys. The eagles that use this area during the day most likely travel downstream to one of the currently protected roost sites, travel upstream to roost in unmonitored trees, or use trees on the Saddle Mountain Wildlife Reserve side of the river that cannot be seen from any of the roost monitoring locations.

100-K

A total of three eagles were observed at this location during FY 2016 night roost surveys. One adult was observed on January 11 and two adults were observed on January 18. This location is located in close proximity to the 100-K reactor site. Remediation activity in this location was very high throughout the FY 2016 roosting season and possibly affected the use of this site.

100-D

This group of trees is located just upstream from the 100-D island which is used heavily by foraging eagles during the daytime. A total of four eagles were documented at this location during the FY 2016 night roost surveys. One eagle was observed on November 30 and three eagles were observed on January 18. The vantage point chosen to monitor this location (downstream of the trees) does not provide a clear view of the entire group of trees, and if eagles were present and perched lower than the tops of the trees they were most likely undetected by the surveyor. Clear views of this location are only be available from the Saddle Mountain Wildlife Reserve side of the river.

Hanford Townsite Upstream

This roost site was historically protected because it included a group of trees downstream where eagles were frequently observed. These downstream trees are now protected and considered a unique roost, and this site was evaluated independently of them. A total of four eagles were documented at this location during the FY 2016 surveys. Four of the 17 surveys performed at this location documented a single eagle utilizing this roost. Based on the direct observations from this monitoring event, protection of the Hanford Townsite Upstream roost is no longer justified.

Hanford Townsite Downstream

Three eagles were documented at this location during the FY 2016 surveys. Two eagles were observed on November 23 and one eagle was documented on December 7.

3.1.3 Administrative Protection

Administrative protection will be initiated at a new roost site if monitoring determines the presence of three or more eagles on at least two nights during a year, or if continued monitoring over two or more years determines that the site is occupied at night by one or more eagles at least 30 percent of the time ([DOE 2013](#)). Based on this definition and the direct observations from FY 2016, all of the eight currently protected night roosts continue to qualify for administrative protection. The five potential roost sites failed to qualify based on this raw data analysis. The direct observations were based on approximately 14 percent of the available nights during the roosting timeframe. Thus, some method of extrapolation is necessary to estimate the number of nights eagles were present at each of the potential roost locations for the entire season. For example, three or more eagles were observed at the “100 D” location during one survey, however it is likely that three or more eagles were present at that roost location on at least one un-surveyed night, which would result in this location qualifying as a night roost. Linear interpolation

was used to estimate the number of qualifying roosting events at the identified roost locations. The formula used is as follows:

$$y = y_1 + (x - x_1) \frac{y_2 - y_1}{x_2 - x_1}$$

In the linear interpolation equation above, y_1 is the first observed number of eagles, y_2 is the second observed number of eagles, and x_1 and x_2 are the corresponding dates. The resulting data were used to estimate the number of qualifying nights at each location, with a qualifying night being ≥ 3 eagles present (Table 3).

Table 3. Linear Interpolation of Potential Night Roost Monitoring Data for FY 2016

| Night Roost Location | Qualifying Nights | Nights with Eagles Present | Total Nights* | % of Nights with Eagles Present |
|-----------------------------|-------------------|----------------------------|---------------|---------------------------------|
| 100 BC | 0 | 0 | 120 | 0% |
| 100 K | 0 | 11 | 120 | 9% |
| 100 D | 1 | 10 | 120 | 8% |
| Hanford Townsite Upstream | 0 | 4 | 120 | 3% |
| Hanford Townsite Downstream | 0 | 9 | 120 | 8% |

*Number of nights between first and last survey

Thus, based on the interpolated results, none of the potential night roost locations qualified for administrative protection as communal night roosts in FY 2016. The 100 D roost site was the only site with 3 or more eagles present during a night. Because this was a single occurrence, it failed to qualify for administrative protection. The interpolated results of all five potential night roosts also fell well below the secondary criteria of occupancy at least 30 percent of the time throughout the night roost season.

The buffer areas shown in the *Bald Eagle Management Plan for the Hanford Site, South Central Washington* (DOE 2013) represent 400-meter buffers applied to the actual roosting observations for all qualified locations for FY 2012 and FY 2013 (the last comprehensive effort) minus any extreme outliers. At the completion of the FY 2016 monitoring season, the same approach was taken, however the roosting observations for FY 2012 through FY 2016 were combined to accurately represent eagle usage at each qualified roost over multiple years. The point-locations of eagles roosting within each qualified roost area, minus any extreme outliers, were mapped in ArcGIS, and a 400-meter buffer was placed around those points to more accurately buffer the actual extents of the roosts (Figure 6). The resulting map will be distributed to Hanford Site personnel via a web link prior to the onset of the FY 2017 Bald Eagle roosting season to ensure that impacts to roosting Bald Eagles and their habitats are minimized on the Hanford Site. The current Hanford Site Natural Resource Buffer Map can be viewed at:

http://www.hanford.gov/files.cfm/NaturalResource_Buffers_WebMap.pdf

3.2 Boat Surveys

Boat surveys were performed on December 14, 2015, January 18, 2016, and February 15, 2016. Total counts and location information for the boat surveys are shown in Figure 5. The maximum count of 125 Bald Eagles documented during the December 14, 2015 boat survey was less than the previous maximum count of 141 recorded during FY 2015 (December 9, 2014) but was still much higher than the average maximum count of 25 between 1961 and 2013. This is most likely due to the record numbers of adult fall Chinook salmon spawning in the Hanford Reach beginning in 2013. For the first time in recent years, the maximum count of eagles on the Hanford Site was documented during night roost monitoring rather than a boat survey (136 total observations on the evening of December 7, 2015). Analysis of corresponding boat and night roost surveys (performed on the same dates) showed that, on average, night roost survey counts were 40% less than the daytime boat survey counts ([HNF-59488](#)). This suggests that a higher maximum count for the December boat survey might have been achieved if it was performed earlier in the month.

A comparison of annual maximum counts of Bald Eagles and fall Chinook salmon redds for the Hanford Reach dating back to 1961 can be seen in Figure 6. Fitzner and Hanson (1979) compared twelve years of eagle survey data on the Hanford Reach with salmon redd and waterfowl densities and found that eagle numbers varied somewhat dependently with the salmon redd numbers but not with changing waterfowl numbers. Their study focused on winter eagle survey numbers collected between 1961 and 1977. During this timeframe eagle populations throughout the United States were at their lowest point due to habitat loss, declining prey availability, the widespread use of DDT, and persecution from ranchers and fishermen. Since that time, a nationwide recovery of Bald Eagle populations has resulted in the delisting of Bald Eagles as an endangered species. The subsequent long-term Bald Eagle data collected on the Hanford Reach appears to adhere to their findings with a much increased response in eagle population to prey availability.

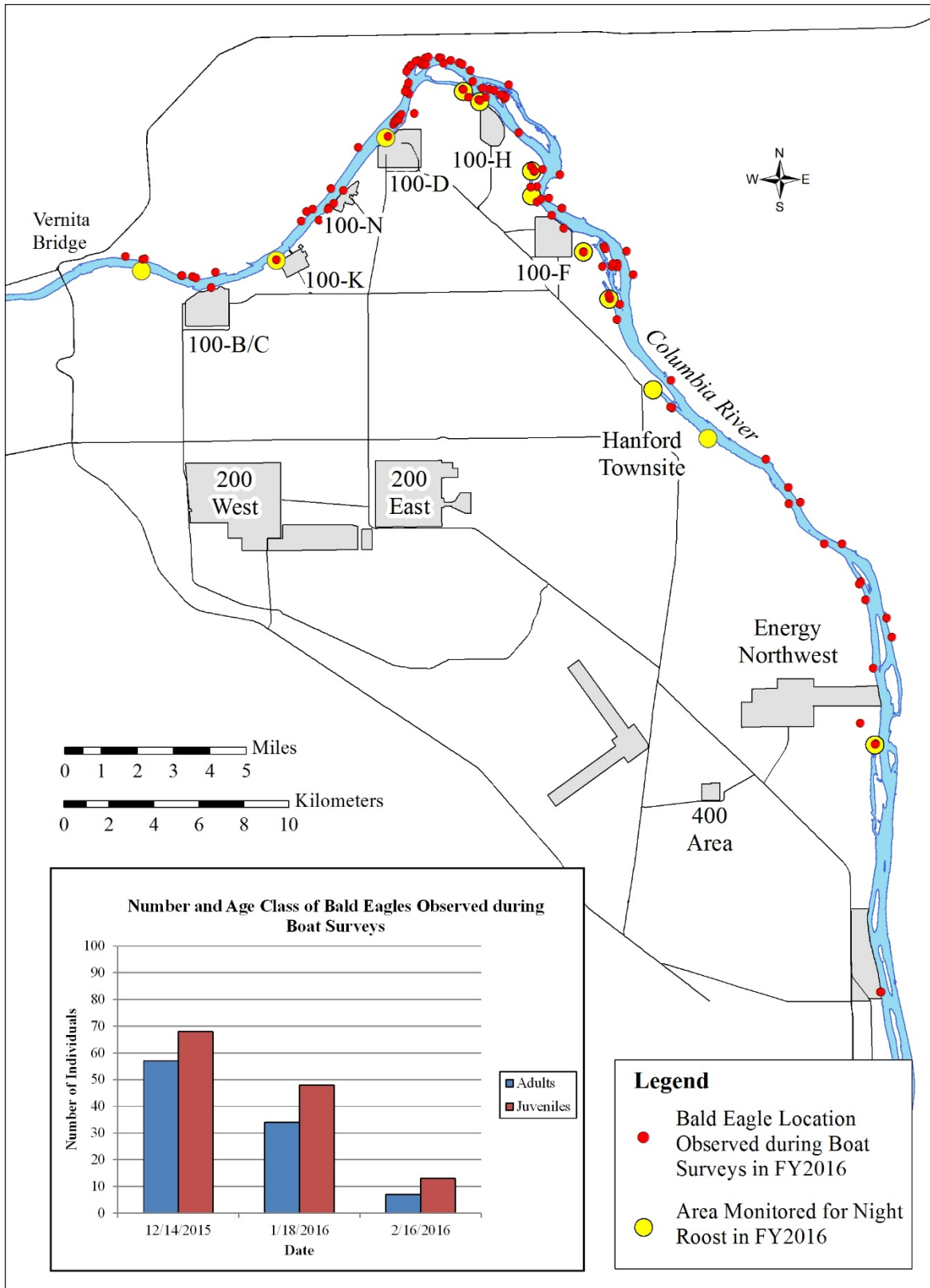


Figure 5. Boat Survey Results for FY2016

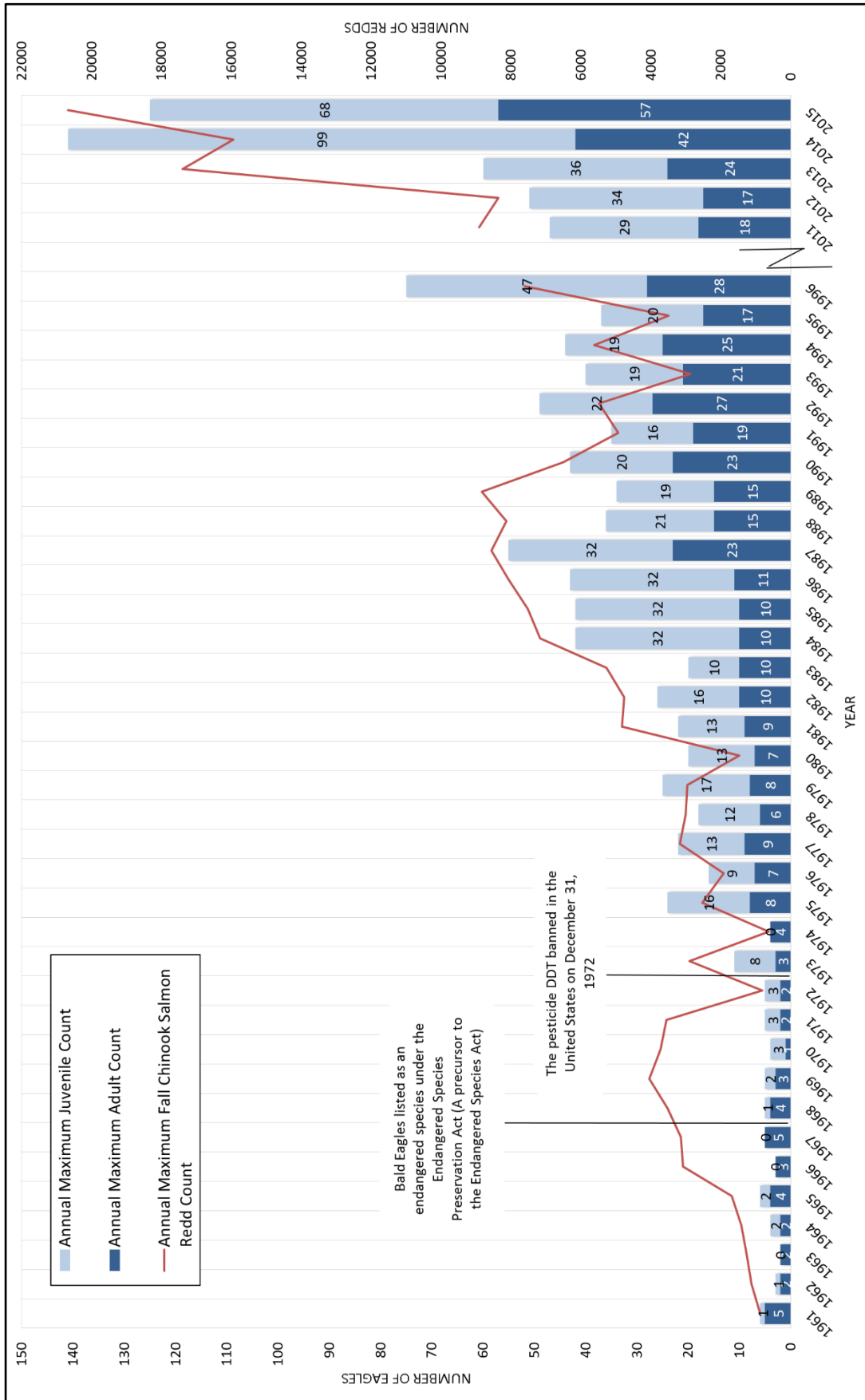


Figure 6. Annual Maximum Count Bald Eagles and Fall Chinook Redds from 1961 to Present

3.3 Nest Surveys

Bald Eagle nesting attempts have been documented on the Hanford Site dating back to the 1960s and until recently, these nests were typically abandoned by late spring. Beginning in FY 2013 and again in FY 2014, monitoring staff documented a successful nest upstream of Wooded Island that produced a pair of fledglings. In FY 2015, the nest was successful for a third consecutive year with three fledglings observed near the nest in late spring. During FY 2016, monitoring staff performing deer surveys noted that a large stick nest was being constructed on a tower near the Bonneville Power Administration's (BPA) Benton substation approximately 1100 meters northwest of the upstream of Wooded Island nest site. Monitoring staff later confirmed that the nest was active and that the Wooded Island nest was nearly gone, assumedly from the eagles using the old nest materials to build the new nest. Frequent monitoring was required during the nest building stage to determine whether or not the new nest created a potential fire hazard with the power transmission lines. Nest surveys were performed weekly starting on February 2, 2016 through March 16, 2016. The BPA concluded that the nest was not an immediate fire hazard, thus monitoring frequency was reduced to bi-weekly for the remainder of the nesting season. On April 27, 2016 monitoring staff confirmed that the nest was successful with the documentation of two Bald Eagle chicks in the nest. The nest was continually occupied through the final nest survey (May 12, 2016). Although the *Bald Eagle Management Plan for the Hanford Site, South-Central Washington* ([DOE 2013](#)) states that nest-site buffers are to be maintained for five years following occupation, a management decision was made to remove the nest after the young have fledged in order to minimize the risk of future fire hazards or structural instability of the tower. As of this writing, the tentative plan for removal includes installing deterrents on the tower and moving the nest materials near the old nest location. Further details regarding the nest removal will be included in the FY 2017 monitoring report.

The nest located on the White Bluffs peninsula was occupied throughout the FY 2015 nesting season, but because its location was obscured by foliage later in the nesting season, monitoring staff could not confirm that the nest was successful. On June 5, 2015, surveyors performing a roadside breeding bird survey documented a juvenile Bald Eagle perched in the tree containing the nest, which could indicate a successful nest attempt, however, actual success could not be determined. During FY 2016, bi-weekly nest surveys were performed at this location from March 16, 2016 to May 12, 2016. The nest was occupied during all nest surveys, however for a second year in a row, no chicks were observed. Monitoring staff opportunistically visited the nest site throughout June and July of 2016 in an attempt to determine success, however no chicks were observed. Although success has not been documented at this location, occupation of this nest past May 10 ensures that nest-site exclusion buffers will be enforced for no less than five years ([DOE 2013](#)).

On March 16, 2016, nest surveys were performed at both nest locations during a test of Energy Northwest's emergency management sirens located along the river corridor to document any potential effects on the nesting eagles. No significant changes in behavior were documented. A summary of all observations documented during the FY 2016 nest surveys is shown in Appendix A.

4.0 Conclusions

Long term monitoring of the status and trends of Bald Eagle populations clearly show that national, state and regional protections were successful in reestablishing this species on the Hanford Reach. Although the Bald Eagle was removed from the federal endangered and threatened species list, the species is still protected under federal law. Understanding how Bald Eagles utilize the Hanford Reach is essential to ensure continued compliance with these laws.

Eagles are sensitive to disturbance throughout all nest stages, but are especially sensitive to human disturbance during the earlier stages of the nesting cycle. Disturbance during courtship, nest building, egg laying, and incubation can lead to abandonment of the nest. Continued protection of nest sites from human disturbance is necessary to minimize the impacts of ongoing Hanford operations.

Nest sites are currently identified during boat surveys and night roost monitoring. The seasonal timing of these surveys allows monitoring staff to more easily detect nest building and nesting behavior. As the season progresses, nest monitoring is performed only on land and outside of the 400-meter protection buffer zone. Nest monitoring becomes much more difficult as foliage begins to obscure the direct lines-of-sight to the nest. With successful nests documented on the Hanford Site for four consecutive years, future monitoring efforts could benefit from the addition of one or more boat surveys during the nesting season to provide an alternate viewpoint of the nests when land-based viewpoints are obscured by foliage.

5.0 References

- Bald and Golden Eagle Protection Act of 1940*, [16 U.S.C. 668-668d, 54 Stat. 250](#). U.S. Fish and Wildlife Service.
- Burke Museum. 2013. Washington Birds Breeding Phenology Project. University of Washington. Accessed 5/22/2013: <http://www.burkemuseum.org/ornithology/phenology>.
- Eisner, Sherry A. 1991. *Bald Eagles Wintering Along the Columbia River in South Central Washington: Factors Influencing Distribution and Characteristics of Perch and Roost Trees*. Master's Thesis, University of Montana.
- Fitzner, R., E., and Hanson, W., C. 1979. *A Congregation of Wintering Bald Eagles*. The Condor Vol. 81, No. 3 (Aug., 1979), pp. 311-313
- Cranna, K., J. Nugent, J. Wilde, and J. Grzyb. 2015, *Bald Eagle Monitoring Report for Fiscal Year 2015*, HNF-59488, Rev. 0, Prepared by Mission Support Alliance for the U.S. Department of Energy, Richland, Washington. Online at: http://www.hanford.gov/files.cfm/HNF-59488_-_Rev_00.pdf.
- Migratory Bird Treaty Act of 1918*. 16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755 U.S. Fish and Wildlife Service. Online at <http://www.fws.gov/laws/lawsdigest/migtrea.html>.
- Revised Code of Washington (RCW) 77.15.130. Protected fish or wildlife – Unlawful taking. Online at <http://apps.leg.wa.gov/rcw/default.aspx?cite=77.15.130>.
- U. S. Department of Energy (DOE). 2013. *Bald Eagle Management Plan for the Hanford Site*, South-Central Washington. DOE/RL 94-150, Rev. 2. U.S. Department of Energy, Richland Operations Office. Richland, WA. Online at <http://www.hanford.gov/files.cfm/Hanford%20Bald%20Eagle%20Management%20Plan%20Rev.%2002%20-%20FINAL.PDF>.
- U.S. Fish and Wildlife Service (USFWS). 2007. *National Bald Eagle Management Guidelines*. U.S. Fish and Wildlife Service, Midwest Region. Online at <https://www.fws.gov/southdakotafieldoffice/NationalBaldEagleManagementGuidelines.pdf>
- Washington Department of Fish and Wildlife (WDFW). 2011. *Bald Eagle Management and Protection in Washington State*. Washington Department of Fish and Wildlife, Olympia, Washington. Online at http://wdfw.wa.gov/conservation/bald_eagle/.

APPENDIX A

Nest Survey Observations Summary

| Nest Location | Date | Time | # of Adults | # of Juv | Observations |
|-------------------|-----------|------|-------------|----------|--|
| Benton Substation | 2/2/2016 | 1550 | 1 | 0 | Adult perched on wooden transmission pole (western line) |
| | | 1552 | 1 | 0 | Adult flew and landed at old nest site |
| | | 1600 | 1 | 0 | Adult perched at old nest site |
| | | 1610 | 1 | 0 | Adult perched at old nest site |
| | | 1620 | 1 | 0 | Adult perched at old nest site |
| | | 1630 | 1 | 0 | Adult perched at old nest site |
| | | 1640 | 1 | 0 | Adult perched at old nest site |
| | | 1650 | 1 | 0 | Adult perched at old nest site |
| Benton Substation | 2/9/2016 | 1546 | 2 | 0 | 1 adult BAEA perched on wooden utility pole SW of nest on transmission tower. Another adult BAEA at old nest tree |
| | | 1556 | 2 | 0 | 1 adult BAEA perched on wooden utility pole SW of nest on transmission tower. Another adult BAEA at old nest tree |
| | | 1606 | 2 | 0 | 1 adult BAEA perched on wooden utility pole SW of nest on transmission tower. Another adult BAEA at old nest tree |
| | | 1616 | 2 | 0 | 1 adult BAEA perched on wooden utility pole SW of nest on transmission tower. Another adult BAEA at old nest tree |
| | | 1626 | 2 | 0 | 1 adult BAEA perched on wooden utility pole SW of nest on transmission tower. Another adult BAEA at old nest tree |
| | | 1636 | 2 | 0 | 1 adult BAEA perched on wooden utility pole SW of nest on transmission tower. Another adult BAEA at old nest tree |
| | | 1646 | 2 | 0 | 1 adult BAEA perched on wooden utility pole SW of nest on transmission tower. Another adult BAEA at old nest tree |
| | | | | | |
| Benton Substation | 2/16/2016 | 1630 | 1 | 0 | Nest empty. One adult on high wood pole utility line adjacent to nest |
| | | 1640 | 1 | 0 | Nest empty. One adult on high wood pole utility line adjacent to nest |
| | | 1650 | 1 | 0 | Nest empty. One adult on high wood pole utility line adjacent to nest |
| | | 1700 | 1 | 0 | No change. JWW drove through buffer checking signs. Eagle stayed on pole |
| | | 1710 | 1 | 0 | No change, JWW's vehicle within 300m buffer. Bird not disturbed |
| | | 1715 | 1 | 0 | Adult eagle left pole, soared briefly and then landed on nest |
| | | 1720 | 1 | 0 | One adult on nest, Hanford patrol interaction with JWW. |
| | | 1725 | 1 | 0 | No change |
| Benton Substation | 2/22/2016 | 1635 | 1 | 0 | One adult sitting in nest (coming in from the West) |
| | | 1640 | 0 | 0 | No bird visible from this angle |
| | | 1645 | 0 | 0 | Can't see anything in nest - different vantage point (from substation) |
| | | 1650 | 1 | 0 | Confirmed second adult sitting on wooden utility pole near nest |
| | | 1655 | 2 | 0 | Confirmed adult has been in nest entire time and second adult on wooden pole |
| | | 1700 | 2 | 0 | One in nest; One on wooden pole |
| | | 1710 | 2 | 0 | Adult on nest flew out to mate with defensive calls. Both flew to another wooden pole; we moved quickly away from nest |
| | | 1715 | 2 | 0 | One adult moved back to nest and other back to original pole |
| | | 1720 | 2 | 0 | One in nest and one on nearby pole |
| | | 1725 | 2 | 0 | One in nest and one on nearby pole |
| | | 1730 | 2 | 0 | One in nest and one on nearby pole |
| Benton Substation | 2/29/2016 | 1645 | 0 | 0 | No birds seen in nest |
| | | 1725 | 0 | 0 | Still no birds in or near nest |
| | | 1740 | 0 | 0 | No birds on or nest or on utility poles nearby - one adult at roost on old nest tree |
| Benton Substation | 3/7/2016 | 1705 | 1 | 0 | One adult on nest |
| | | 1730 | 1 | 0 | One adult still on nest, appears to be moving lower in nest as we get closer |
| | | 1735 | 1 | 0 | Nest definitely "cleaned up" since last week after high winds, can't see adult but hasn't left nest |
| | | 1740 | 1 | 0 | Can just pick out head at top of sticks |
| | | 1745 | 1 | 0 | Pretty close to nest; adult not budging |
| | | 1750 | 1 | 0 | Still in nest; hunkered down - only top of head and eye visible |
| | | 1756 | 2 | 0 | Second adult flew around nest and landed at nearby pole; eagles "calling" to each other - vocalizations |
| | | 1814 | 2 | 0 | One adult still in nest; second adult moved to closest pole to nest |
| | | | | | |

| Nest Location | Date | Time | # of Adults | # of Juv | Observations |
|------------------------|-----------|------|-------------|----------|--|
| White Bluffs Peninsula | 3/16/2016 | 0950 | 1 | 0 | One adult on nest |
| | | 1000 | 1 | 0 | One adult on nest, no reaction to alarm test |
| | | 1010 | 1 | 0 | One adult on nest |
| | | 1013 | 2 | 0 | During the second test, the bird in the nest began calling, a minute later another adult landed in the nest. They began nest building activities |
| | | 1020 | 2 | 0 | One in nest, one perched on branch above. Perched bird flushed halfway through third alarm test |
| | | 1030 | 1 | 0 | One adult on nest, started calling during fourth alarm test |
| | | 1040 | 1 | 0 | One adult on nest |
| | | 1050 | 1 | 0 | One adult on nest |
| Benton Substation | 3/16/2016 | 0950 | 2 | 0 | One adult sitting in nest, one adult perched at old roost site |
| | | 1000 | 2 | 0 | One adult sitting in nest, one adult perched at old roost site |
| | | 1003 | 2 | 0 | Siren test for ~3 min; no noticeable response/reaction from eagles |
| | | 1012 | 2 | 0 | Second Siren test for ~3 min; no noticeable reaction from eagles |
| | | 1017 | 2 | 0 | One adult sitting in nest; eagle at roost site flew to wooden power pole near nest |
| | | 1020 | 2 | 0 | One adult on nest; one perched on wooden power pole |
| | | 1030 | 2 | 0 | One adult on nest; one perched on wooden power pole |
| | | 1040 | 2 | 0 | One adult on nest; one perched on wooden power pole |
| | | 1041 | 2 | 0 | Third Siren test for ~3 min; no noticeable reaction from eagles |
| | | 1046 | 1 | 0 | Eagle perched on pole flew towards river; other still on nest |
| | | 1048 | 1 | 0 | Fourth Siren test for ~3 min; no noticeable reaction from eagle on nest |
| Benton Substation | 3/28/2016 | 1040 | 2 | 0 | Both adults on nest |
| | | 1050 | 2 | 0 | Both adults on nest |
| | | 1100 | 2 | 0 | One adult on nest, one flying |
| | | 1110 | 2 | 0 | Both adults on nest |
| | | 1120 | 2 | 0 | Both adults on nest |
| | | 1130 | 2 | 0 | Both adults on nest |
| | | 1140 | 2 | 0 | Both adults on nest |
| White Bluffs Peninsula | 3/28/2016 | 1225 | 2 | 0 | One adult on nest, one on branch above nest |
| | | 1235 | 2 | 0 | One adult on nest, one on branch above nest |
| | | 1245 | 2 | 0 | One adult on nest, one on branch above nest |
| | | 1255 | 2 | 0 | One adult on nest, one on branch above nest |
| | | 1305 | 2 | 0 | One adult on nest, one on branch above nest |
| | | 1315 | 2 | 0 | One adult on nest, one on branch above nest |
| | | 1325 | 2 | 0 | One adult on nest, one on branch above nest |
| Benton Substation | 4/12/2016 | 1000 | 1 | 0 | One adult on nest |
| | | 1010 | 2 | 0 | Two adults on nest |
| | | 1015 | 2 | 0 | Took pictures of nest while inside buffer, both birds flushed |
| | | 1020 | 2 | 0 | Two adults on nest |
| | | 1030 | 2 | 0 | Two adults on nest |
| | | 1040 | 2 | 0 | Two adults on nest |
| | | 1050 | 1 | 0 | One adult on nest |
| | | 1100 | 1 | 0 | One adult on nest |
| White Bluffs Peninsula | 4/12/2016 | 1200 | 1 | 0 | One adult on nest |
| | | 1210 | 1 | 0 | One adult on nest |
| | | 1220 | 1 | 0 | One adult on nest |
| | | 1230 | 1 | 0 | One adult on nest |
| | | 1240 | 1 | 0 | One adult on nest |
| | | 1250 | 1 | 0 | One adult on nest |
| | | 1300 | 1 | 0 | One adult on nest |
| White Bluffs Peninsula | 4/27/2016 | 1105 | 1 | 0 | One adult on nest |
| | | 1115 | 1 | 0 | One adult on nest |
| | | 1125 | 1 | 0 | Moved around in nest, appeared to be cautious of eggs, then laid back down |
| | | 1135 | 1 | 0 | One adult on nest |
| | | 1145 | 1 | 0 | One adult on nest |

| Nest Location | Date | Time | # of | # of | Observations |
|------------------------|-----------|------|--------|------|--|
| | | | Adults | Juv | |
| Benton Substation | 4/27/2016 | 1155 | 1 | 0 | One adult on nest |
| | | 1205 | 1 | 0 | One adult on nest |
| | | 0905 | 2 | 0 | Both adults perched on wooden utility poles adjacent to nest |
| | | 0915 | 2 | 0 | Both adults perched on wooden utility poles adjacent to nest |
| | | 0925 | 1 | 2 | Adult on nest with two chicks; adult is feeding both |
| | | 0935 | 1 | 2 | Adult on nest with two chicks |
| | | 0945 | 1 | 2 | Adult on nest with two chicks |
| | | 0955 | 1 | 2 | Adult on nest with two chicks |
| | | 1005 | 1 | 2 | Adult on nest with two chicks |
| | | 1015 | 1 | 2 | Adult on nest with two chicks |
| Benton Substation | 5/12/2016 | 0915 | 1 | 0 | One adult on nest |
| | | 0925 | 1 | 0 | One adult on nest |
| | | 0934 | 1 | 1 | One adult on nest, one juvenile popped up |
| | | 0935 | 1 | 1 | One adult on nest, one juvenile popped up |
| | | 0945 | 1 | 1 | One adult on nest, one juvenile popped up |
| | | 0955 | 1 | 2 | One adult on nest, second juvenile popped up |
| | | 1005 | 1 | 2 | One adult on nest, second juvenile popped up |
| | | 1015 | 1 | 2 | One adult on nest, second juvenile popped up; the second adult returned to the nest after the survey was over and I was driving away |
| White Bluffs Peninsula | 5/12/2016 | 1120 | 1 | 0 | One adult on nest |
| | | 1130 | 1 | 0 | One adult on nest |
| | | 1140 | 1 | 0 | One adult on nest |
| | | 1150 | 1 | 0 | One adult on nest |
| | | 1200 | 1 | 0 | One adult on nest |
| | | 1210 | 1 | 0 | One adult on nest |
| | | 1220 | 1 | 0 | One adult on nest |